

NOTES ON *MELANOPHORA RORALIS*
(LINN.) (DIPTERA)

BY FRANK MORTON JONES
Wilmington, Delaware

In 1903 Professor C. T. Brues published (*Entomological News*, vol. 14, p. 291) an interesting account of his discovery, made at Woods Hole, Massachusetts, that the larva of the Dexid fly, *Melanophora roralis* (Linn.), is an internal parasite of "sow-bugs" (Oniscidæ, *Porcellio* sp.), pupating within the body-cavity of its deceased host.

Meager European-references had indicated the possibility of a wider range of larval habits for this insect; but in 1934 the careful work of W. R. Thompson (*Parasitology*, vol. 26, pp. 378-448, pls. 15-22) demonstrated that *roralis* (with related species) occurs regularly as a parasite of the Oniscidæ, and his taxonomic studies of larva, puparium and adult placed *roralis* on a firm basis for future recognition. Of this species his material was not abundant, and his few field-records related to European conditions.

The following observations on *roralis* were made at Vineyard Haven, Marthas Vineyard Island, Massachusetts, hence only a few miles from the place of Professor Brues' discovery of 1903. In the summer of 1946 I was conducting a series of experiments with various chemicals to which insect-attractant qualities had been attributed. In some of these tests the selected chemical was dropped upon a plaster-of-Paris disc substituted for the usual bait-receptacle in a Rummel-type trap. On August 28, as I uncorked a small vial for rebaiting one of these traps with isoamyl salicylate, a small black-winged fly circled about the rim of the uncorked vial; and in the nine days terminating on that date, forty-one flies of that same species had appeared in the trap thus baited, along with only three flies of other species. No comparable response to other baits was noted, in the three similar and adjacent traps operated through this period. These results seemed

indicative that isoamyl salicylate possesses a strong selective attraction for this one fly, *Melanophora roralis* (Linn.); but the termination of the experiments then prevented further confirmatory observations.

With the later-acquired knowledge of the identity of the insect and after reference to Professor Brues' account of its parasitic status, it seemed desirable to give *roralis* closer attention through the succeeding summer. However, that endeavor encountered unexpected difficulties, for not only was 1947 generally recognized as a year of unusual insect scarcity, but in May and June of that year 2700 acres of Marthas Vineyard, including the area under observation, had been sprayed from the air with DDT, and the oniscid host of *roralis* was not present in numbers approaching those of the preceding year. Only by persistent search and daily observation did some features of the economy of the insect become apparent.

Upon my arrival on Marthas Vineyard, June 22, *roralis* was promptly detected as a "window-pane" fly. Thereafter, through the summer, five bait-traps yielded one hundred and six examples of *roralis*; many others were recorded from the windows, screens and walls of the house, indoors and out. These adults occurred over two well-defined periods—the first extending from (at least) late June to mid-July, then after nearly a month's interval (actually by August 10) the flies commenced to appear again and were present throughout the remainder of the month and as late as September 5, when opportunity for observation terminated. These dates seem to indicate that in New England *roralis* has at least two annual broods. In England (Thompson) the winter is passed as second-stage larvæ and no summer brood appears.

Search for the early stages of *roralis* was continued throughout the summer, more successfully under the loose bark of fallen trees, where sowbugs often congregate. In early July a few empty and broken puparia, each partly enclosed in the dry fragments of a sowbug, were found. On July 23 two living larvæ and one puparium were found, each in a body of a recently deceased sowbug. Mean-

while, twenty-five apparently healthy adult sowbugs had been installed in a gallon jar, with layers of bark for shelter and concealment, and pieces of apple and of potato for food. On August 10 this jar was found to contain 18 living sowbugs, fragments of 7 others, and 3 living puparia of *roralis*; on August 21, only 13 living sowbugs remained, and no additional *roralis*. That is, at least 12% parasitism was indicated and a much larger fatality through cannibalism, a recognized sowbug trait. Examination of the 13 survivors showed that among these, two species were represented—*Oniscus asellus* Linn. and *Porcellio scaber* Latr.; and the fragments enclosing *roralis* puparia indicated that both these species had served as hosts. Emergences of *roralis* adults (four) took place on August 11 and August 15.

Adult *roralis* is diurnal in habit, rarely appearing among the overnight captures of the bait-traps, and only once in a light-trap operated throughout the season.

Further experiments with chemical baits (conducted in collaboration with Mr. Charles P. Kimball of Rochester, New York) forced some modification of the belief that isoamyl salicylate possesses a unique attraction for *roralis*, for in 1947 traps baited with other chemicals sometimes captured fully as many flies of this species, and it became a question whether the entrance of the flies into the traps, in part at least, might not be ascribed to their habit of penetrating and exploring narrow crevices and cavities, rather than a response to attractive odors. A few experiments with an unbaited trap tended to confirm that suspicion.

The almost uncanny ability of *roralis* to gain entrance to screened houses may be attributed to this habit. Indoors, these flies do not usually evince strong attraction toward food, and their lives are apparently short, for their dead bodies occur commonly on window-sills, in cobwebs, and not rarely in bathtubs or in bowls of washstands where perhaps the presence of moisture attracts them.

Long ago it was suggested (W. D. Pierce, 1907, U. S. Bull. Ent. 64, pp. 15 and 22) that sowbugs, because of their

unsavory habitats and scavenger habits, might be concerned in the transmission of disease. From most modern dwellings the sowbug is usually excluded; but *roralis*, its intimate associate, passes all ordinary barriers and may penetrate to all the rooms of human dwellings. Should the suspicion against the sowbug be substantiated, then *roralis* too may be recognized as a potential source of danger.